

Hobbies

WEEKLY

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SUPPLEMENT DESIGN
FOR WATERLINE
MODEL TUG

February 9th, 1949

Price Threepence

Vol. 107 No. 2780

Get an early start on making your TRAILER CARAVAN

READERS who wish for a delightful and carefree holiday should travel the countryside in a caravan. One can of course be hired, but the expense of such hire would go a long way towards the cost of making a caravan of one's own. The actual work of construction is not hard, not more difficult in fact than making a decent garden shed. Perhaps the only really difficult part, if difficult it can be called, is the arrangement of the underworks—wheels, brakes, etc., and here a little expert assistance may be welcome.

The Floor

Construction should commence with the making of the floor of the caravan, as this forms a handy platform on which to build the frame and other parts. A plan of the floor and side view of it mounted on the wheels, is given in Fig. 1.

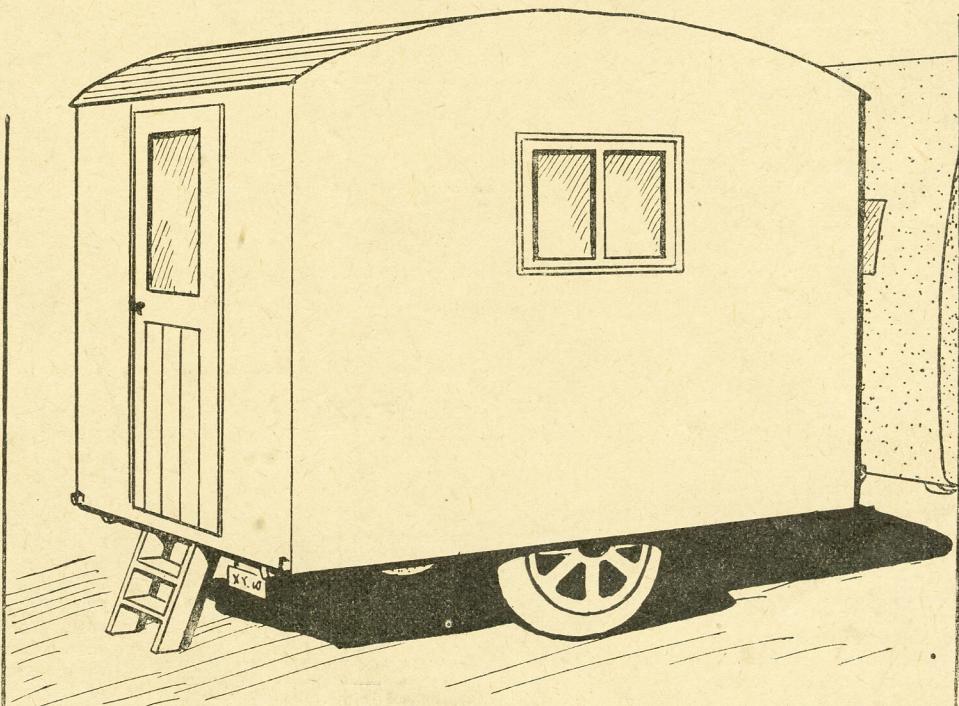
Cut the side timbers to length given, then the end cross rails, from 2in. by 3in. deal, and join them together at the ends to make a frame using a mortise and tenon joint, as at A, Fig. 2. The cross rails are fixed at 3ins. from each end so

that the overall distance from rail to rail is 9ft., the length of the caravan.

Three intermediate rails, also of 2in. by 3in. wood, are notched across, as at B, at the distance shown in the plan. Glue and nail these joints firmly. On the frame the flooring, of $\frac{7}{8}$ in. T. & G. floorboards, is to be

laid a little later, but before doing this part of the work it will be found convenient to fix the underwork first.

These underworks comprise the following:—A pair of 30in. motor wheels, a pair of strong car springs, and a towing bar. With the wheels, a $1\frac{1}{4}$ in. square steel axle should be



ordered, long enough to ensure a wheel base of 4ft. 2ins. The wheel base is the distance between the wheels, measured from the centre of the tyres. Also provide a pair of powerful brakes.

The springs are fixed to the axle from below, being what are called underslung. To effect this a piece of

automatically. At this stage, unless the reader has some knowledge of the business, also the traffic laws, he will be well advised to seek the help either of a garage assistant, or a motor engineer, to ensure everything being O.K. All being satisfactory, the flooring can be nailed across the frame.

proceeds, to admit them. Allow ample room for the wheels.

Wheel Boxes

To cover these, wheel boxes are to be added, but this job is best left to the last so the height the wheels rise, when the caravan is loaded, can be better estimated, and the correspond-

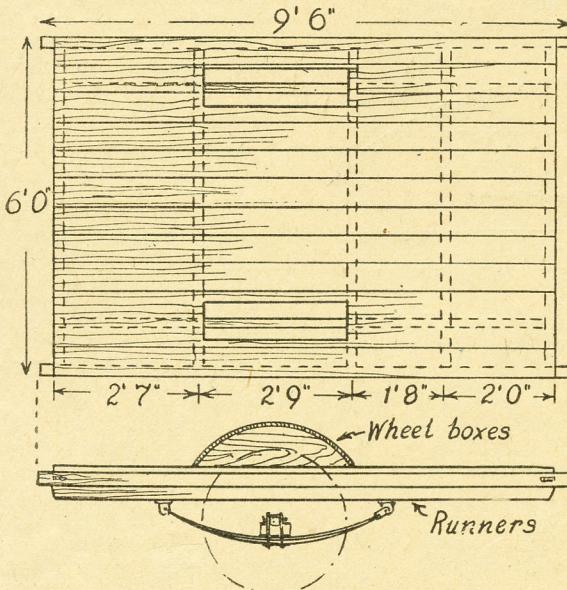


Fig. 1—Plan of floor and side view showing springs

$\frac{1}{4}$ in. thick iron bar is bent round three sides of the axle, to embrace it snugly. Under this a block of hard-wood, 6ins. long and 2ins. thick is placed, and the spring positioned under the block, the whole being securely bolted together with a pair of U bolts.

Springing

The complete fitting is shown in Fig. 3, and should be plain enough. To ensure a strong fixing, (very important this), an iron plate is added under the spring, drilled for the U bolt, which passes through it and is bolted underneath. The width of the block and bent iron fitting over the axle is the same as the width of the springs. The plate under the springs is about 2ins. wider and the legs of the U bolts should be wide enough apart to pass over the springs closely.

These springs are now screwed to wooden runners, of 2in. by 3in. wood, the runners themselves being bolted to the underside of the floor frame. Arrange the position of the springs so the wheels are not central to the frame but 3ins. away from the centre, towards the front. The caravan will then tend to tilt slightly upwards at the end fixed to the car.

Now fit the brakes and see these act quite efficiently. The tow bar should be purchased, and it is wise to get one embodying a spring arrangement to operate the brakes

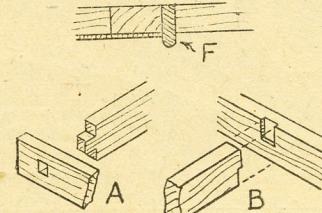


Fig. 2—The joints entailed

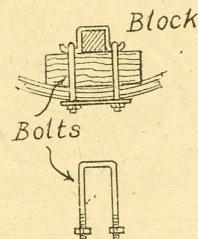


Fig. 3—Detail of spring blocks and fixing

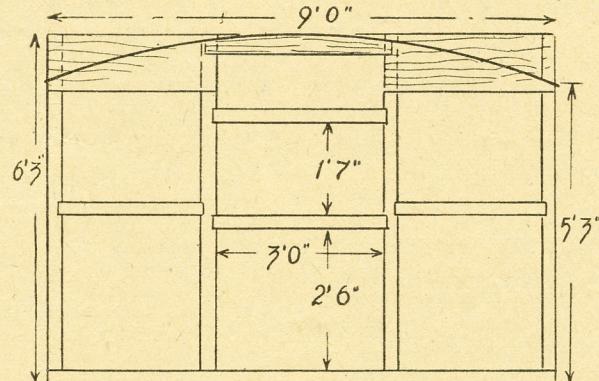


Fig. 4—Construction and measurements of side frames

It will be seen that the wheels rise above the frame, so openings should be cut in the floor, as the work

height of the boxes fixed. It will be convenient now to give the floor on its underside a coat of creosote.

Side Frames

The side frames of the caravan are shown in Fig. 4, made up of $1\frac{1}{4}$ in. by 3in. sound deal, except the top pieces, which are cut from $\frac{7}{8}$ in. board. The vertical members are halved into the horizontals, as at C in Fig. 5, and the cross rails notched into the verticals, as at D. Nail or screw the joints securely. At the top, boards, 1ft. 4ins. wide are halved into the verticals each side of the centre, while across the centre a 4in. wide board fills the gap. When fitting the wide boards, leave a space, as shown at E, for the centre 4in. board to enter, and be nailed in place.

Owing to the width, two 8in. wide boards should be glued edge to edge to make the distance. When the frames are completed mark off the end heights (5ft. 3ins.) and from there draw a curve to mark the roof. This can conveniently be done by bending a long flexible strip of wood and running a pencil along it on to the wood sides.

All work must be done correctly to ensure strong rigid joints and framework which will withstand rough road and field usage.

(To be continued)

CUTTING LIST

FLOOR FRAME

Sides (2) 9ft. 6ins. long, 3ins. wide, 2ins. thick.
Crossrails (5)—6ft. long, 3ins. wide, 2ins. thick.

Runners (2)—6ft. long, 3ins. wide, 2ins. thick.

SIDE FRAMES

Verticals (8)—6ft. 3ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.
Horizontals (2)—9ft. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

Horizontals (4)—3ft. 1in. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

Horizontals (4)—2ft. 7ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

FRONT AND BACK FRAMES

Verticals (8)—5ft. 3ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.
Horizontals (4)—5ft. 9ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

Horizontals (2)—1ft. 7ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

Horizontals (2)—1ft. 10ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

Horizontals (2)—1ft. 8ins. long, 3ins. wide, 1 $\frac{1}{2}$ ins. thick.

Roof Rafters (3)—5ft. 9ins. long, 2ins. wide, $\frac{1}{2}$ in. or 1in. thick.

$\frac{7}{8}$ in. by 4in. floorboards, 180ft. run.
 $\frac{7}{8}$ in. by 8in. board for side frames,
30ft.

$\frac{1}{2}$ in. by 1 $\frac{1}{2}$ in. lining strips, 60ft.

Wood for door and windows extra
to above. Sides of wheel boxes cut
from waste, also steps.

A few odds and ends can easily be converted into A NOVEL GAME

MOST handymen are on the lookout for interesting and easily-made games, and here is one that will quite repay in fun and pleasure the time taken in the making. The general idea is "fish catching". There is a base upon which are several kinds of fish standing vertically.

Each player is supplied with a rod and line and it is his or her job to "land" as many fish as possible, or alternatively the fish with the highest numbers as explained in a moment. When the base is clear the player with the largest number of catches or score wins. Four persons can quite well play at once so the game is just the thing for amusing your friends, large or small.

Construction

Now as to the construction. Obtain two squares of $\frac{1}{4}$ in. wood 12ins. by 12ins. The one is to make a base and the other goes on top with slots taken out as shown. The slots can be cut but the quickest way to make them is to divide the top square into five strips, three of them being 3ins. wide and two $1\frac{1}{2}$ ins.

From the sides of the strips now take out the recesses as (A). These are not hard to make as one is working on the edges of the material. Saw cuts and a sharp chisel will do the work nicely, or a fretsaw could be employed. Each recess must be about $\frac{3}{16}$ in. deep (so that it will hold $\frac{1}{4}$ in. wood nicely) and $1\frac{1}{2}$ ins. in length. They are spaced 3ins. apart but only $\frac{3}{4}$ in. from the ends to the outer slots. The right-hand strip, it will be noted, is plain with no recesses as the side of each slot is made by the edge of the next strip (B).

With the recesses cut, now fix the strips to the under square of wood, using glue and one or two fine sprigs or screws (from below). Before putting together make sure that each slot has a clean edge as they can be readily cleared out at this stage but

not so easily later on. The completed board looks as (C).

The Fish

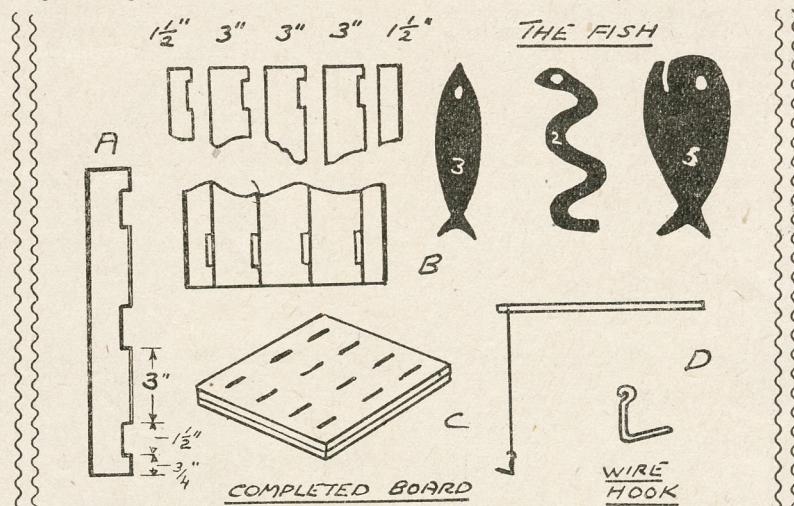
Now let us make the fish cut-outs. These should be 5ins. high, and are taken from $\frac{1}{8}$ in. plywood, their tails being reduced so that they will fit into any of the $1\frac{1}{2}$ in. slots on the board. In the nose of each is a circular hole a little under $\frac{1}{4}$ in. in diameter—this being for the hook.

The fishing tackle (D) is made up of pieces of dowel about 15 to 18ins. long, a length of twine 18ins. in

To make the game look neat, the base should be painted a sea green and the fish a number of colours like grey-green with reddish spots in places. The body of the fish where the tail joins, also the mouth and any other part which seems to require it, can be outlined in black with good effect.

Each fish should now be furnished with a number, going from one to twelve. These figures can be painted on the sides with a little of any of the colours just used.

All is now complete so just a few



length, each supplied with a wire hook on the end. The shape of the latter is rather important, as the standard hook shape will not catch in the holes in the fish. It therefore is shaped as shown, tests being made to secure that hanging freely on the line, the bar, which has to go into the hole, slopes slightly upwards.

Very pliable twine of the 'kite cotton' variety should be used and fairly heavy wire employed for the hooks. Fasten the twine very firmly to both rod and hook.

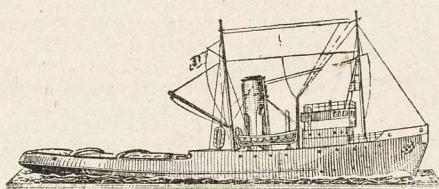
points about the game itself. The aim, of course, is for players—all standing at the same distance—to 'catch' the fish by getting their hook through a hole in a nose. Once the hook is in the fish is pulled out and kept by the player. If two players only are using the board it is sufficient to let the one who gets the most catches be the winner.

For Several Players

Where there are several playing then it is more fun to add up the score of the caught fish according to the numbers on the sides. If two players by any chance land the same fish—that is, both their hooks get into the hole—then the fish must be put back in the slot and fishing continued.

A further variation of play is to cover each number on the sides with a flap of gum paper, caught only along the top edge. The fish are then mixed so no one knows which fish carries a certain number. The game proceeds as usual till all the fish are landed, the tabs of paper then being raised and the score taken. Thus the players do not know till the game is over whether they have won or not. It will create very good fun and much exciting competition.

Our Design for a MODEL RESCUE TUG



THIS realistic waterline model of an Envoy class Rescue Tug is made from patterns (No. 2780) on this week's gift sheet. The kit of wood, with mast rod, wire and rigging cord is obtainable from Hobbies Branches for 3/- or post free for 3/9 from Hobbies Ltd., Dereham, Norfolk.

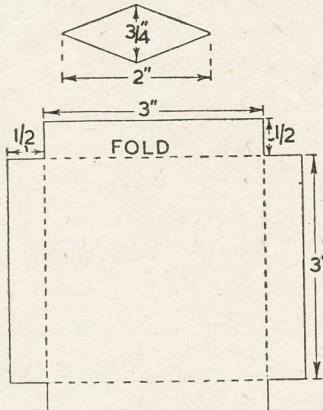
The home metal worker can easily complete this handy POKER STAND

THIS attractive poker stand can be made from scrap pieces of material and in addition to being decorative, has a definite utility value. The cost is negligible except, perhaps, in patience required, but fireside stands such as this will find ready sale among neighbours and friends.

First of all, have a good look at the accompanying diagrams and study them carefully until you have a good idea of how they are to be developed. It is always a good policy to get a thorough grasp of the theoretical aspect of any job before commencing the actual construction.

The Side Pieces

These four parts are plain rectangles $6\frac{1}{4}$ ins. long by 4 ins. wide, which allows $\frac{1}{4}$ in. lap at the top end. Cut out two pieces of material and then bend each of them to right angles half way across the length. Do



Outline of the base piece and the diamond-shaped overlay parts

this before lapping the top edges or you will have difficulty getting a neat fold owing to the double thickness of metal preventing your blocks from lying flat along your material.

The next job is to lap the top edges and these must be knocked over inwards, using a mallet to avoid marking. When fit they can be lightly smoothed over with the hammer. Rest the lapped edge downwards on the corner of the bench iron, and tap smartly with the hammer and piece of wood, in order to countersink. This should leave a nice smooth bead outside.

The Overlays

Before joining your pieces together to form the body, you will find it more convenient to attach your overlays at this stage.

Cut out four diamond shaped pieces as the diagram, file off sharp edges,

and clean with emery. Also clean the side pieces and mark off position for overlays. Next, apply flux—heat the iron and tin the marked places and one side of the overlays, leaving a slight body of solder on the latter.

Rest your side piece solid on the edge of the bench plate, put the overlay in position, and then lay a well-heated iron over it. As soon as the heat has penetrated sufficiently to melt the solder on both pieces, press tightly together with a file and withdraw iron, holding in position until the solder sets. This will make a very neat sweated joint, with very little solder showing. Treat all four overlays in a similar manner.

The Corners

The corner pieces, $5\frac{1}{2}$ ins. long and $\frac{3}{4}$ in. wide, having to support the body, must be cut out of rather stronger material and, after cutting, bent over at right angles in the blocks. Check these angles with a square, as the symmetry of the finished article will depend on their accuracy.

Assembly

To assemble the body, take one of the side pieces and tack a corner along each edge. You must get these corners on absolutely straight in order to keep the whole job square. See also that the bottom edges are flush with edge of body.

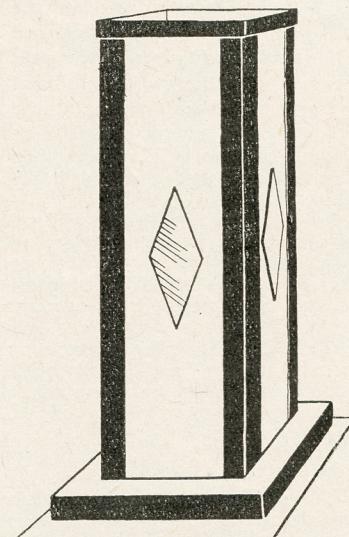
Next, place the other side in position and tack. Solder the corners firmly to the body, squeezing together with a pair of pliers, in order to achieve a neat joint. For additional security, solder down the inside of the corners where the edges of the side pieces meet. Having got the body into its final shape, solder the other two corner pieces along the folds in the sides so the four corners will match.

The Box Base

Cut out a base piece as per dimensions in the diagram and bend the edges at right angles to form a shallow box. Three of the edges may be bent in the blocks but the fourth will have to be knocked over on the edge of a piece of iron clamped to the bench. Solder up the corners inside, leaving some solder on for support.

Next, cut out a base plate of stout material, the stronger the better, 4 ins. square, and file the edges smooth. Mark a $\frac{1}{2}$ in. border and on it rest the box base, edge down, filing until it is a flush fit, before tacking in position. Solder right round, leaving a bead of solder on to fill up the joint.

Having done this, mark another $\frac{1}{2}$ in. border round the topmost piece and place the body in position, filing



The Completed Stand

flush as per above. Solder this round, again leaving a body of solder along joint.

Wipe off all traces of flux with a damp rag, which must be burned afterwards. To finish off the job, file all soldered portions nice and smooth, and give a good rub all over with fine emery to polish.

Painted Finish

To impart a smart professional finish, give two coats of good enamel, preferably heat-proof, in two contrasting shades of brown. The actual colour can be varied, but in any case should be dark, because a light shade is sure to become marked and dirty when the article is in use. The overlay diamond can be a bright contrast colour if you wish.

MORE SUCCESSES

WE are pleased to mention more successes of an enthusiastic Middlesbrough reader, Mr. W. I. Easton, of Eston, who has carried off prizes at Hobbies shows with a Tea Caddy Design, the Halfpenny Galleon, etc. Mr. Easton has been winning with his efforts now for a great number of years, and we hope will continue to do so. In one of these Exhibitions a 1st Prize was also awarded to Mr. French of Worton-on-Tees for his Hobbies Locomotive Model of the Great Northern 4470. A tray was also shown made of 1,500 matchsticks.

A simple and efficient home-made fixed focus ENLARGER

THE fixed focus pattern of enlarger is simpler in construction than the focussing type, and is quite efficient to work with. The size of enlargement, however, is fixed, but in actual practice this is no serious detriment. The one illustrated can be made from any spare wood available, as near to the thicknesses given as possible. The lens necessary will be mentioned later in the article.

Firstly, as regards the size enlargement desired. This must be decided on first, and will of course be a matter of personal choice. Having settled this matter three pieces of wood must be cut to this size, plus 18ins. larger each way.

Enlargement Sizes

For example, if the chosen enlargement is half plate, i.e. $4\frac{1}{4}$ ins. by $6\frac{1}{4}$ ins., then the pieces of wood will have to measure $6\frac{1}{4}$ ins. by $8\frac{3}{4}$ ins. A thickness of $\frac{3}{8}$ in. will do for the wood pieces, though stouter wood can be used if the thinner stuff is not at hand.

These three pieces will be made to form the negative holder, A, lens board, B, and enlargement board, C. These will be dealt with separately. Fig. 1 shows A and B together. Cut some strips of deal, $1\frac{1}{4}$ ins. wide and $\frac{1}{2}$ in. thick, and glue and nail these to the wood pieces to form stiffening frames.

At each corner cut out a piece $1\frac{1}{4}$ ins. long and $\frac{1}{2}$ in. wide. These are to admit the horizontal bars which hold the lot together. In the centre of A cut out a window the size of the plate, or film negative. Cut it rather full so that the negative can lie quite flat.

The Window

On the inner side of the frame glue thin strips round the window, allowing them to overlap it by $\frac{1}{8}$ in. to make a rebated opening shown by the cut-away portion. Now cut two thin pieces of clear glass to fit the window, between which the film can be secured. If plates are used instead of film, these glasses can be omitted.

Having made frame B the same dimensions as A, mark the exact centre by crossed diagonal lines and

bore a hole through to fit the lens. Any good achromatic lens will serve, about 1in. or $1\frac{1}{4}$ ins. diameter and focus some 4 to 5 ins.

Such a lens may be bought from most optical firms, but perhaps the cheapest way to obtain it would be to rummage round the second-hand shops in search of an obsolete box camera, $\frac{1}{4}$ plate size. Such old cameras can generally be bought very cheaply, with any luck, of course.

Mounting the lens should present no difficulty. Quite possibly the whole lens fitting could be removed and refitted to the frame without trouble. If the lens is of the unmounted type then glue a thin piece over the lens hole, having a hole bored through it slightly less in diameter than the lens. The latter can then be dropped in and held in place with three metal clips, or a strip of card bent round the hole, and glued in, to press on the edge of the lens and keep it in position.

Making the Shutter

At this stage a shutter can be made and fitted. This is detailed in Fig. 2. D. To most amateur photographers the sketch will be self-explanatory. The shutter is a piece of tin, or thin wood about four times longer than the width of the lens. It is enabled to slide over the lens between tin or wood guide strips, as shown, and should be able to move quite freely, though not loosely.

A hole, the size of the lens, is bored through the shutter, where shown, and to one end a stiff wire is soldered, the wire passing through a suitably sized hole in the framing strip.

Frame C is shown at Fig. 2. It is made up exactly as frames A and B, and in the centre an opening is sawn out the size of the proposed enlargement. It should be added here that this hole must be sawn out before the framing strips are fixed, as these, by

overlapping the opening by some $\frac{1}{8}$ in. subsequently form a rebate to hold the glass, which is cut to fit the opening.

The Cover Panel

A wooden panel is cut to cover the glass, as at E. If the opening is cut out with a fine fretsaw blade, quite likely the piece cut out can be utilised as the panel.

On the inside face of the panel glue a piece of velvet, or baize. The panel should be held securely against the glass by means of a pair of turn buttons. It may be necessary here, if the panel is the same thickness wood as the frame, to cut a shallow recess each side to allow the turn-buttons to come over the wood, as it will obviously, owing to the glass, stick out a little. A neat, close fit, and a secure fastening, is necessary.

All three frames should now receive a coat of some dead black stain, the fittings (shutter, etc.) being removed for the purpose. The shutter is also blacked, but should be taken apart for the purpose and refitted when the black stain is dry.

Now prepare four horizontal bars of wood from $\frac{1}{2}$ in. by $1\frac{1}{4}$ in. stuff. Their length should be some 3 to 4ft. long. These are screwed to frame A and extend outwards.

Frames B and C are fitted inside these bars, but not fixed to them yet, so they can be moved along them as

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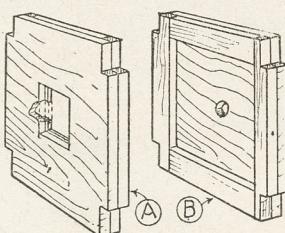


Fig. 1—The negative holder

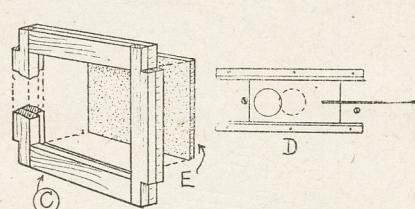


Fig. 2—Details of the shutter parts

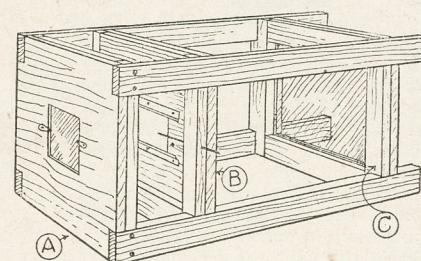
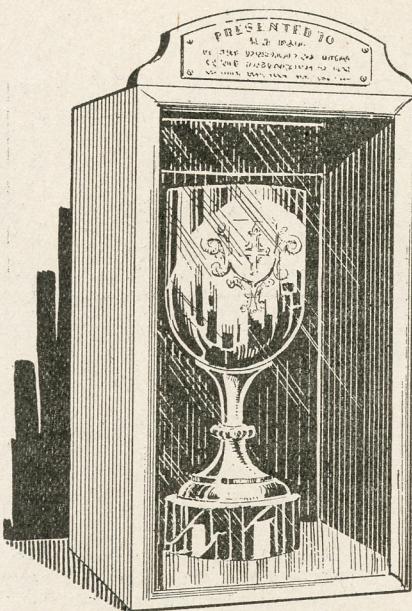


Fig. 3—Constructional view of box frame

Winners of sports trophies should keep them in A CUP CABINET



HERE is no doubt a large number of our readers hold a presentation cup awarded them for some particular sporting event. Many of them set great store upon such a trophy, and would desire a special place or cabinet in which to preserve it from dust, etc. In this short article we are telling how to make a simple cabinet for a cup about 7ins. high.

Of course the method of making and assembly shown here would quite well be applicable to a larger cabinet, but care must be taken to increase the thickness of the wood for the whole of the cabinet if it is say, more than half as large again. That is if the cabinet is above 15ins. in height.

Wood and Dimensions

Wood $\frac{1}{4}$ in. thick is suggested for the cabinet shown in our sketch. The internal dimensions of the cabinet are height, $8\frac{1}{2}$ ins., width $4\frac{1}{2}$ ins. and depth $3\frac{3}{4}$ ins. The cabinet is so constructed that the removal of the cup if desired is made possible by taking off the back. Should the glass become broken then provision has been made for replacing it in a simple manner.

The cabinet is made up of two sides A, measuring 9ins. by $3\frac{3}{4}$ ins. and a top and floor B, each measuring 5ins. by $3\frac{3}{4}$ ins. The lap or pin joint is used for jointing all these four pieces together, and some little care must be exercised in first marking out the open mortises and tenons and then cutting them in with the fretsaw.

Divide the width of each piece of wood at the extreme ends into five,

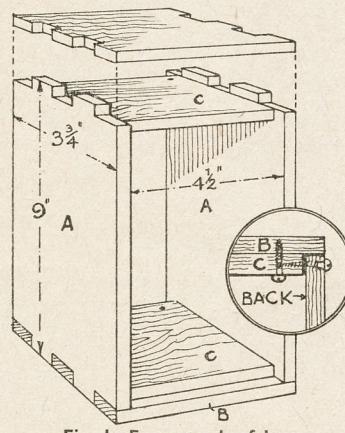
and then set down a depth of $\frac{1}{4}$ in., which will be the depth in each case of all the mortises and tenons. Then run lines across the width of each piece $\frac{1}{4}$ in. up from their extreme ends. Take note then of the arrangement of the tenons and the mortises, as in Fig. 1; see that the tenons here show on the sides and that the mortises occur on the ends of the floor and top.

Glue should be brushed on sparingly to the joints which, when made and put together should be tested with a square. To stiffen the framework, four small brass angle plates could be added on that face which has been chosen for the back surface of the cabinet (see Fig. 2). The width of the plates should not exceed $\frac{1}{4}$ in., and countersunk screws used. To make a really neat job of these plates, they should be let into or recessed to the thickness of the brass, so that the plates ultimately do not project beyond the face of the wood.

Fixing the Glass

To form the rebates to hold the glass in place first prepare four pieces of beading $\frac{1}{4}$ in. by $\frac{1}{8}$ in. in section and each piece rounded on one edge. Two pieces 9ins. long and two pieces $4\frac{1}{2}$ ins. long will be wanted and all will be cut to 45 degrees mitre at the ends to fit accurately round the front surface of the frame. In Fig. 3 we see the position of the parts with a cut-away section of the beading. In the smaller diagram here a section through one edge of the cabinet is given, showing how the glass rests against the beading and is held from the rear by the inner pieces C.

It is these inner pieces C which complete the rebates for the glass at the top and bottom. Cut two pieces of the $\frac{1}{4}$ in. wood, $4\frac{1}{2}$ ins. by $3\frac{3}{4}$ ins. and, having cut the glass to size and dropped it into place from inside on the front mitred strips, screw the



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pieces C to the top and floor pieces B. Keep hard up against the glass and use round-head screws as fixing. Two screws—each piece should be inserted near the back edge of the pieces inside the cabinet, while one screw could be put through near the front on the outside.

Dust Preventer

It would be quite a good plan to cut two strips of washleather $\frac{1}{4}$ in. wide and glue them to the front edge of pieces C. This forms a cushion against the glass and helps to exclude dust and damp. If the glass becomes broken the two pieces C are easily unscrewed and replaced.

As a finish to the top of the cabinet, a shaped pediment may be cut and fixed. In Fig. 4 a suitable shape is given for such a piece. The dotted lines on the pediment piece indicate where a plate may be fixed, bearing the name of the recipient and other data.

Polished Finish

Without doubt the most suitable finish is french polish. Before this is put on, the wood should have its grain filled with woodfiller. The inside of the cabinet should be coated with matt black paint.

The actual back of the cabinet should be cut to fit closely inside the sides and hard up against the internal pieces C as shown as an enlarged detail in Fig. 1. Round-head screws should be used here.

If you have a larger or smaller cup to display, then all measurements can be altered in proportion. A heavier wood used if the cabinet is larger.

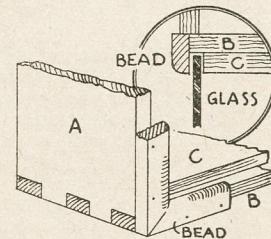


Fig. 3—Glass fixing details

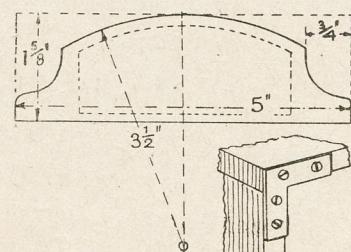


Fig. 4—Shape of pediment

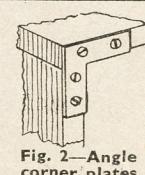


Fig. 2—Angle corner plates

The handyman should know about the variety and THE USE OF SAWS

PROBABLY the tool which our readers use more than any other, is the saw, and strange as it may seem, there are so many varieties, it is questionable whether any reader or worker has them all. Mention of the saw may call to their minds such common or garden ones as the hand-saw, the tenon saw, and, of course, the fretsaw.

These are probably known to everyone, but when it gets down to such varieties as a compass-saw, a pad-saw or a bow-saw, the matter may seem to be getting a little more involved.

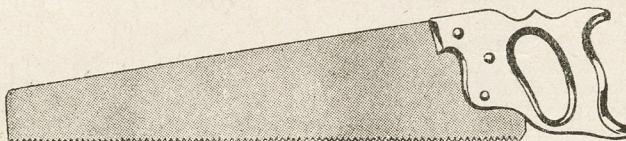
Most of us, however, know the elementary principles and demands of the tool itself. It is simply to cut

particular line. Obviously cheap blades cannot be made from the same quality steel or pass through the process of sharpening that the more expensive ones have.

The Hand-saw

Let us look at some of the more common varieties of saw, and note the requirements of them. The most common, of course, is the hand-saw, and this is obtainable in a variety of lengths. The ordinary carpentry saw can be 18, 24 or 26ins. long. In pre-war days it was possible to buy them as small as 10ins., but now the range is very considerably restricted.

The saw should be of good quality steel which will allow the blade to be turned almost into the handle, then



The Hand-saw is normally obtainable with blade of various lengths

through a board in a clean, workmanlike method, and for this, the ordinary hand-saw is the best tool. There are, however, occasions such as cutting curves, angles and interior shapes where a different type is demanded, and for this reason the variety mentioned has come into being.

Value of Quality

How or when they started, is a matter of history, but undoubtedly the Egyptians of the early days had their primitive methods of cutting both wood and stone for their requirements. Naturally, with the progress of time, a better tool was evolved, and today the best saws are made from very fine quality hard steel with an edge which will cut through even the toughest wood.

It is, as in all other instances, a mistake to obtain an inferior saw and expect it to cut smoothly and correctly. Cheap steel loses its edge and in consequence requires sharpening much more often than a good class tool. A large hand-saw, for instance, may look quite good even if in a cheap quality, but you will find it buckles and refuses to remain straight in use, or that the teeth become blunt and refuse to function.

Not the Cheapest

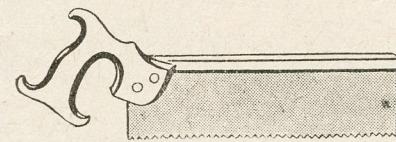
The worker is advised, therefore, to obtain the best value for money he can, and to pay a reasonable price for any saw he may purchase. The same applies to fretsaw blades, which are probably the tiniest things in this

bind, and in consequence the set has to be put on to the saw again by means of a file or a proper saw setting process.

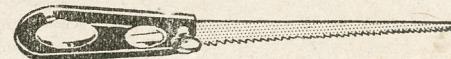
In this, the saw is held in a vice and the file passed across alternate edges at the angle illustrated. It is obviously one of the elementary rules of using this particular saw, to have absolute control on the handle and to take a long straight stroke.

The width of the blade will cause it to bind in the wood if a vertical stroke is not maintained, because obviously it cannot bend on a curved cut.

The cutting stroke is actually on the downward pressure, which is the opposite way from that in the very unusual Japanese saw. In consequence, as long a stroke as possible



The popular and handy Tenon Saw



The Keyhole Saw for special occasions

spring back to its original position without showing any sign of bending.

The blade itself varies in thickness, having its greatest width nearest the handle, and being finest along the back edge and towards the front end. Obviously, too, if the teeth are merely cut from the edge, difficulty would be found in pushing the whole piece through the wood because the blade would bind in the cut. The teeth are, therefore, "set", which merely means they are pushed out each side alternately and the edge filed on alternate sides to provide a sharp cutting action.

As the teeth proceed through the wood, therefore, they cut away slightly wider than the saw blade itself, thus allowing the whole tool to work through the opening easily and smoothly. Obviously as the teeth wear, there is more tendency to

should be maintained, and a fairly rapid up and down action used. Be careful, however, not to pull the blade up too far towards the toe, or the point will stick into the wood and cause the saw to bend and rather shake the user if he is not careful.

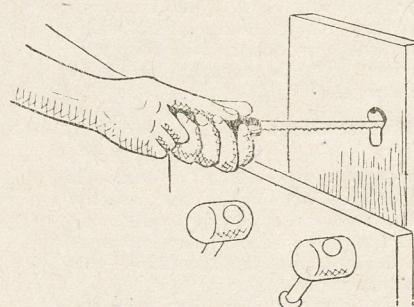
The Rip-saw

The rip-saw should, of course, be used with the material on trestles if a large plank is being cut, and the use of this particular kind is mostly confined to large work of ordinary carpentry type. Use of this saw will be found much more difficult when you are cutting with the grain, and for this purpose a rip-saw has been produced. This will do the work more rapidly as the teeth are specially designed for the purpose.

The Tenon Saw

Next we come to what is, perhaps, the more common saw for our readers, and that is the tenon saw. There are, again, a variety of uses for this, and an equally large variety of saws themselves. Although it was originally intended for cutting tenons for joints, it comes in as a general purpose saw on many occasions. Here the blade is much shorter, and is usually obtainable anything between 10 and 14ins. long.

The tenon saw should have a comfortable handle, firmly fixed to a good quality blade, and be fitted with



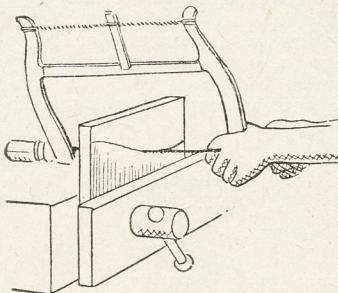
The Keyhole Saw in use

a brass back which will keep it straight and firm. The most generally useful size is about 14ins., but in every case the teeth are much smaller than on the hand-saw. It is used with the wood on the bench, and when commencing, the thumb is placed on the mark to be cut, and the blade pushed close to it for the first stroke to be drawn.

The Keyhole Saw

Next we come to the saw which is required for cutting out interior work, and which as its name suggests, was originally intended for keyholes.

The keyhole saw has a long tapering blade, and is sometimes called a compass-saw. The actual shape of the handle may be like the ordinary



The Bow-saw in use

hand-saw, and the blade is similar in style but very much smaller. Some handles are provided with more than one length of blade so it can be changed according to the work in hand.

The method of use is to drill a hole large enough to take the tiny blade, then to start the cutting in the direction required. This type of saw can be used on a larger curve, or any normal angles, but it cannot be turned to the small shapes in the manner as a fretsaw.

The Bow-saw

We also illustrate a most peculiar looking tool, known as a bow-saw,

An Enlarger—(Continued from page 229)

required for focussing purposes. The arrangement is shown in Fig. 1. If the bars do not grip frames B and C firmly enough to allow them to stand without tilting, then tie a length of cord round them just behind the last frame.

How to Use

Place a negative in position, and move frame B until its lens is approximately its correct focal length from the negative. In frame C insert a piece of white paper and secure the panel behind it to press the paper against the glass.

Now move C to and fro, also B, as may be necessary, until the picture is sharply focussed on the paper and the correct enlargement size. Take care to get the frames truly vertical, then screw the bars to them, and saw off the surplus left.

All that is needed now to complete

and this probably is the original primitive cutting tool used. Here we have a long narrow blade of equal length from end to end, held by a framework with two handles. The tension of the blade is obtained by the primitive method of twisting string through a piece of wood turned through the centre loop, much in the way of a tourniquet.

Obviously such a saw is more clumsy to use, and both hands are required to manipulate it. In consequence, it is giving place very largely to the fretsaw which is much more simple and satisfactory.

Similar to the keyhole saw, we have what is known as the pad-saw, and here the blade is very similar to the keyhole saw, but is fixed into a different shaped handle. There is a variety of these shapes, and the one illustrated is that made by Hobbies, Ltd., as being comfortable and practical.

To Prevent Buckling

As can be seen, the back end of the blade is held by a special fixing method in the handle itself. In use, a hole is made with a drill, then the keyhole saw operated in the usual way. One of the common faults is that if it is used too quickly, the blade gets hot, then buckles. Take an even, steady stroke, keeping the teeth firmly on the cutting line and use at rightangles to the wood.

The average use of a saw by the amateur does not wear its teeth or cutting edge down very much, but if a woodworker is doing a considerable amount of cutting, he will realise the saw is gradually getting blunt. It is only making for hard work if you use a saw that requires sharpening, because not only does it take more forcing through the wood, but there is more aptness to turn or buckle in the blade itself.

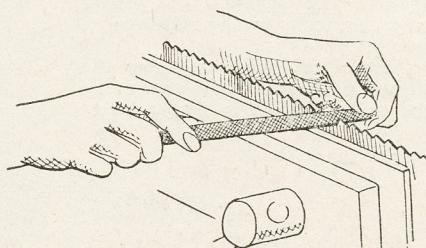
Have the setting done by an expert, and you will notice the difference in use. The saw should not need to be forced through the wood

with any great amount of pressure, but by a normal weight of the hand holding it firmly in position, it should cut through the grains of the material cleanly and steadily.

One occasionally sees a worker getting quite hot in attempting to cut through a board with the hand-saw at a terrific rate. This is needlessly tiring, and if one takes a steady stroke and allows the teeth to cut normally, a straightforward operation is performed without undue trouble.

Keep Clean Blades

All sawblades are of bright steel, and should not be allowed to get rusty. They are usually sold with a film of vaseline or oil, and as this gets rubbed off in use, it should be



Sharpening teeth with a file

replaced from time to time. This is particularly the case if the saw is being left in a damp shed or workshop.

If the rust does happen to get on, it should be cleaned off with emery cloth, then the bright surface preserved by rubbing the oil over. Do not have a definite coating, but merely a light film over the whole surface.

If the saw has a tendency to stick, a spot of grease on the teeth will help it through, but it must be remembered this is apt to colour the wood and should not, therefore, be used when special work is being undertaken. A drop of oil smeared on will serve the same purpose.

the enlarger is to cover it in. The cheapest method of doing this is to use common cardboard. Cut four pieces for the purpose, stain them black on the inside surfaces and fix them on with glue and small pins. Cover the angles with strips of tape to trap any light leaks that may appear. A small hole should be made in the cardboard for the wire operating the shutter to come through.

Shutter Stops

The shutter, by the way, should have two stops fitted, to ensure it closing and opening the lens correctly. These can be just round-headed screws, fitted about where shown at D in Fig. 2. Fit them accurately—this is important.

The simplest plan is to push the wire in until the lens opening is safely

closed, then to drive in a screw to prevent it being pushed in any further. Now draw the wire until the lens is exposed, then add the second screw to limit its movement any further.

Suitable Covering

As now completed, it must be admitted that while the enlarger is ready for use its appearance is rather amateurish, not to say drab. It is a good plan, solely of course for appearance sake, to cover it with leatherette, or American cloth, glued over. The result looks neat and workmanlike.

If, however, these materials are too expensive, a quite decent effect can be obtained by covering with brown paper, and using gummed paper tape over the angles and corners. Get all parts neat and tidy in finish.

All about the fish you can keep if you have a TROPICAL AQUARIUM

THE Tropical Aquarium is becoming increasingly popular with hobbyists. This is not surprising when we consider the many beautiful little fish available for stocking. Fish are of wonderfully diverse colours and form, some lovely as "living flowers" and all pleasing and attractive.

Beginners have a wide choice to select from; indeed, so numerous are the fish suitable for the Tropical tank that it may be difficult to decide on the species you would prefer to start with. Having obtained a suitable aquaria and the necessary heating apparatus, and a few plants such as *Vallisneria spiralis* and *Sagittaria natans*, or *Sagittaria latifolia*, the next thing is to select the tenants for it.

It would require a book to describe all the species that will thrive in a tank kept at the correct temperature, round about 75 degrees Fahrenheit. Herewith is a brief list of some of the more popular varieties suitable for the beginner.

Live-bearers

These are small tropical fishes of interesting habits, originating from Central America and the West Indies. The peculiarity of these fish is their way of producing their young. The eggs are hatched within the body of the female and the embryo young issue forth as "free swimming fish." They will breed readily enough in a suitable tank, beginning with one size 24 by 12 by 12 in., but a larger tank will be required as the fry grow, if they are numerous.

Of these Live-bearers the following are recommended :

Guppy : These do well in any tropical aquarium ; the males are multi-coloured.

Moon Plat : Lovely fish in shades of red, blue, yellow, and spangled ; deep-bodied fishes, male 1½ ins.; female, 2 ins. There are also the Red Plat and Wagtail Plat, variants.

Swordtails : These include Double Swordtail Guppy, Green Swordtail, and Red Swordtail. The lower rays of the male's tail are in the form of a sword, hence the name. Colours vary, green, golden, black, red and spangled. The female lacks the sword-like tail.

Molly or Sail Fin : Some are black, as the Perma Black Molly. The Mollies have large dorsal fins in the males. Handsome fish for the aquaria.

For the Live-bearer tank the best kinds of plants include *Myriophyllum* and floating plants as Water Fern. All the Live-bearers are delightful fishes for the breeder ; they bring forth their young periodically, the

number of fry in a brood varying from twenty to a hundred or more.

The Swordtails are bigger than the Guppy, and the males are apt to be pugnacious ; you require but one male to several females in the breeding tank. Remove the older fish to another tank when the desired number of young ones have been produced. Avoid overcrowding your tank.

Barbs, Characins, and Chichlids

Barbs : These are very active fish, breeding similarly to goldfish. Their natural habitat is in India and also in the Malay Peninsula. There are many attractive varieties, which include the Rosy Barb, Cherry Barb, Tiger Barb, Nigger Barb.

The Rosy Barb is most suitable for the beginner, and it is a favourite fish with aquarists ; attains to 4 ins. in length, and is often of a deep reddish or red-brown colour.

Characins : Very attractive and colourful fishes. Their natural habitat is Central and South America and Africa. There are many varieties, among them the Black Widow, the Flame Fish, an excellent fish for the beginner, with red fins, and part of body also red ; dorsal and anal fins are bordered with black.

The Neon Tetra is another good tank fish, and most attractive with its sides lined with two brilliant stripes of iridescent red and blue. Unfortunately, this variety is not easily obtainable nowadays.

Suitable Varieties

The Beacon Fish is another suitable Characin, and has a brassy eye and similar tail spot, hence the name.

Chichlids : These are large fish of the aquarium many of them aggressive, fighting in defence of their young. Some varieties can be bred in the tropical tank. Chichlids are something like perch in appearance, and are native to South America and Africa. The Blue Acara attains 6 ins.

It has a greenish-blue colouring.

The Blue Acara is, perhaps, the best Chichlid for the amateur aquarist to breed with. Another is the Angel Fish—very exquisite—attaining some 6 ins. in size, with black-barred body, and long filamentous pelvic fins.

Catfish and others

Catfishes : These are described by an exhibitionist as the scavengers of the aquarium, "little droll, gnome-like creatures going about their business in a comical manner." Of these catfishes *Corydoras Paleatus* runs nearly 3 ins. long when adult.

There are several other varieties, including the Bronze Catfish, the Pigmy Catfish, and the Leopard Catfish, which is striped and spotted with black.

Anabantids : These fish are peculiar in their breeding habits, the male making a "nest" of bubbles that floats on the surface of the water—in this "nest" the female deposits her eggs. These fish are native to Asia, and are most colourful.

Included in this family are the Dwarf Gourami, the Mosaic Gourami, and the Blue Gourami, the latter of a beautiful sky-blue colour. The Siamese Fighting Fish is an attractive aquarium tenant, and is well suited to the community tank. Adult males, however, must be kept apart, as they will fight to the death. Body colours vary, being red, green, and blue ; the males are the more brightly tinted, the females somewhat poorly coloured in comparison.

Danios and Rasboras : These are fast swimmers, and very prolific. Their natural habitat is India. The varieties most popular with beginners are the Zebra Fish, the Pearl Danio, and the Harlequin Fish, though this latter is now somewhat scarce.

There are other species that may be kept in the tropical aquarium.

(Continued foot of page 234)

International Journalists visit Hobbies

IN order that technical journalists get a background of productivity in the light engineering world the Ministry of Supply recently arranged a tour of East Anglia and visits to certain firms of national repute. The factory of Hobbies Ltd. was one of those included, and the visitors were conducted round by technical directors and managers and accompanied by Mr. G. Roberts, Ministry of Supply Controller for the Eastern Region. The journalists represented periodicals of many countries, and were much impressed by the range of

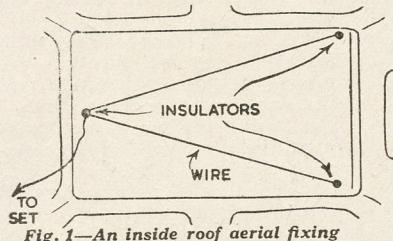
machinery and variety of production in the Hobbies factory. Apart from the normal activities of the fretwork needs, work was being done on all kinds of light engineering, where turning, pressing, drilling, welding, casting, plating, etc. was required. At the lunch, to which the visitors were entertained by the firm, expressions of appreciation were made as well as an agreeable surprise at the capacity and productivity of the firm—reminiscent of the industrial Midlands, rather than an agricultural district. Hobbies will be more widely known than ever.

Some points to note if you are installing A MOTOR CAR RADIO

THE war-time ban on vehicle radios is now a thing of the past and such receivers seem to be becoming increasingly popular. Therefore, some notes on fitting them should prove useful.

The ordinary car receiver is unlike any other kind of set because it has a vibrator or rotary-converter which operates from the 6 or 12 volt accumulator. This unit then supplies the necessary high tension current, valve filament current being taken from the accumulator.

As this can be a somewhat critical arrangement, any special instructions regarding the polarity and voltage to be applied to the set should be followed exactly.



The type shown in Fig. 2 is quite popular, and suction-disc insulators, affixed with glue, can be used. The aerial is very stout wire or thin rod. The short piece in front is for ornament and additional pick-up.

The aerial should run the whole length of the car roof, and be at least 2ins. from the metal. Ordinary insulators can be fixed by a single 3/16in. hole which scarcely damages the vehicle. If the aerial is ever removed, such holes can be filled with a rivet or bolt and painted over.

Bumper Fixing

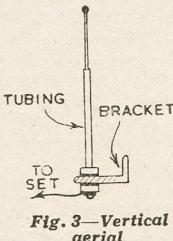
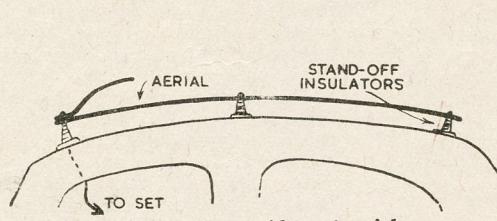
These are fixed to a bracket which can be bolted to a bumper, or other convenient fixture. The rod (insulated from the bracket) is usually

which is generally very convenient. Take care that the person who sits beside the driver is not unduly inconvenienced as regards leg-room. To reduce vibration, rubber washers can be used on the fixing bolts. Proper car radios are usually as small and robust as possible.

Interference

If the set is only used at odd times when the vehicle is not in motion, no trouble will arise. But when the engine is running, interference in the form of regular crackling from the speaker may arise.

To help prevent this, keep aerial and lead-in away from car wiring, especially ignition leads, as mentioned. If the lead-in must pass by the

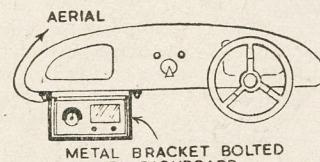


There is no reason, of course, why an ordinary battery-operated receiver should not be used in a car. If so, it will usually prove most convenient to employ the separate batteries as usual.

From the point of view of erecting aerials, a vehicle is most inconvenient. Space is limited and the proximity of metal bodywork weakens signals. Because of this, local stations will be most satisfactory and four valves are desirable for good speaker reception. The user should, therefore, try to get up the best aerial possible, for best results.

Inside Aerials

These will work with metal bodies, though wooden bodies naturally give less screening, and, therefore, louder signals. Fig. 1 shows how a wire can be fixed up inside, the longest piece possible being used. Two strands are better than one, but much criss-crossing or overlapping of wire scarcely improves results at all. The wire should be an inch or two from all metal bodywork.



made so the length can be altered. When well out from the bodywork, these aerials give a fair signal pick-up, and they are easy to fix.

With all the aerials a lead is taken to the receiver. If fairly long, this wire can help to pick up signals. It should not be run near ignition or other wiring in the vehicle, or static will be picked up also. Really good flex is best.

Positions under the dashboard beside the driver, and between the rear seats on the floor, are generally most convenient. A suitable metal bracket can be bent up to hold the receiver secure, this being bolted to holes drilled in suitable spots.

Fig. 4 illustrates such a fixture,

spark-coil, or other likely cause of trouble, then screened sheathing can be used between the aerial and receiver. Do not add this unnecessarily as it also prevents the lead-in picking up useful signals.

If attention to these points does not remove interference from the engine, then ignition suppressors must be fitted. Many different forms of these are made. They usually take the form of small enclosed resistors which are connected in series with each engine sparking-plug. A 1 mfd. condenser may also be connected from the distributor to chassis.

Quite often there will be some variation in signal strength when driving past high buildings, through bridges, etc. Nothing can be done about this, though the better type of receiver will have automatic volume control, which increases amplification as the signal becomes weaker, thus giving a more even output.

It should be remembered a receiver permanently fixed in a vehicle requires a receiving licence.

Tropical Aquarium—(Continued from page 233)

However, the beginner will be advised not to be too ambitious at first, and confine his attention to those mentioned above. The majority of them are omnivorous, and can be fed on a mixed diet of dried food-stuffs, supplemented by occasional

meals of bloodworms, chopped earth-worms, and a little chopped lettuce.

Many of the dealers in aquarium fishes also sell foods suitable for them, making exotic fish-keeping easy and interesting. Breeders of tropical fish in aquaria, perhaps, find their

greatest trouble in feeding the wee fry, which must be fed at first on Infusoria and later on with Daphnia.

Beginners should consult works on tropical fishes for fuller information on what is a most attractive and delightful indoor hobby.

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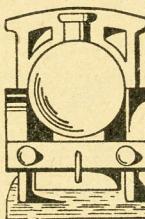


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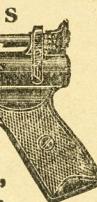
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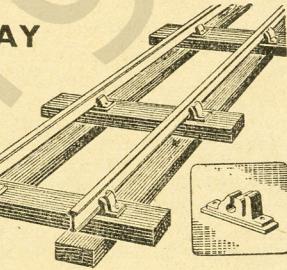
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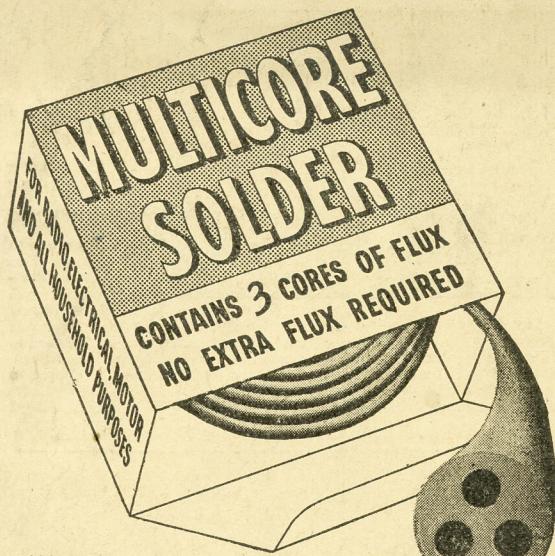
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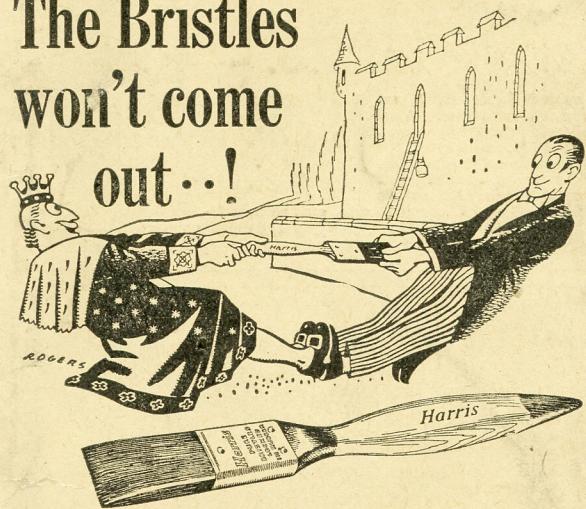
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